

Revisionary Conspectus of Neogeophilidae with Thoughts on a Phylogeny^{1, 2}

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The most distinctive and phylogenetically revealing structures of the Neogeophilidae are, I believe, their absolutely unique first maxillae, their filamentous second maxillary claws, and their pedal fibulungues.⁵

The neogeophilid first maxillae are unique among those of all Geophilomorpha, for in no other family are medial lobes suppressed, and only in the unrelated Mecistocephalidae is the coxosternum cleft in exactly the same manner. (The coxosternal cleavage must have developed independently in the two taxa.) As useful as the neogeophilid first maxillae are for defining the family, they fail to disclose affinity with any other group.⁶

Fibulungues occur uncommonly within the Order, so far as I know, only in *Bothriogaster* (Himantariidae), in *Eucratonyx* and *Sogophagus* (Gonibregmatidae, *s.l.*), and in all Neogeophilidae. They are of three types: (1) both anterior and posterior parungues are hypertrophied, without plantar tooth (*Bothriogaster*); (2) only the anterior parungues are hypertrophied, without plantar tooth (*Eucratonyx* and *Sogophagus*); (3) only the anterior parungues are hypertrophied, with plantar tooth (Neogeophilidae). Considering their structure, it is tempting to suppose that they have arisen independently at least twice, once in the himantariids and again in ancestors common to the neogeophilids and to *Eucratonyx-Sogophagus*.

The evident kinship linking the neogeophilids with certain gonibregmatids is furthermore compellingly reflected in what I take to be the most

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² Chilopoda, Geophilomorpha, Neogeophilidae.

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⁵ Fibulunguis (-gues) = fibula + unguis. A new term to describe those pretarsi which by virtue of their enormously hypertrophied, remarkably modified parungues and massive decumbent ungues have become clasplike hold-fast or anchoring devices.

⁶ Silvestri in 1919, p. 100, fig. 25(3) erred in showing the first maxillary coxosternum of *Himantosoma typicum* Pocock as being midlongitudinally cleft. It is cleft neither in the British Museum type, which I have studied, nor in any other *Himantosoma* specimens that I have examined.

revealing, though subtle, characteristic of all, their common possession of *filamentous* second maxillary claws.

This and other evidence suggest to me that although the Neogeophilidae and Gonibregmatidae are not obviously closely allied (as are, for instance, the Himantariidae and Schendylidae), they are more closely related to each other than either is to any other extant taxon.

For a fuller, though less conclusive, discussion the reader is referred to my 1961 study, pp. 182-187.

At this time I consider the family to be divisible into two genera and four species, all from Mexico and Guatemala. All are summarized below; a key to the genera and species is presented; a new *Neogeophilus* is described.

Evallogophilus Silvestri

Evallogophilus Silvestri, 1917, p. 355.

Diagnostic features: (1) Ultimate pretergite in effect absent, i.e., indistinguishably amalgamated with its tergite. (2) Female pregenital and genital sternites indistinguishably amalgamated without intervening demarcation. (3) At least eight subultimate sternites indistinguishably amalgamated with their subcoxae. (4) Prominent prosternal denticles present. (5) Two or three subultimate sternites with numerous scattered pores (but without formed porefields).

Known species: *E. mexicanus* Silvestri, 1917, p. 357, Mexico, Veracruz: Jalapa Enriquez. Oaxaca: 22.2 miles south of Tlachatengo at 5,800'; 5.4 miles south of Suchixtopec at 8,100'.

Neogeophilus Silvestri

Neogeophilus Silvestri, 1917, p. 352.

Cryptostrigla Crabill, 1961, p. 156. (New Synonymy.)

Diagnostic features: (1) Ultimate pretergite and tergite separate, not amalgamated, the former plainly distinguishable. (2) Female pregenital and genital sternites separate, their intervening demarcation plainly evident. (3) All sternites separate from their subcoxae. (4) Prosternal denticles present or absent. (5) Sternital pores absent.

Remarks. When I proposed *Cryptostrigla*, I relied heavily upon Silvestri's 1917 text and figures, for I had no direct knowledge of *Evallogophilus*, and I had never seen a specimen of *N. primus*. Now having seen material representing all taxa, and particularly impressed with the distinctiveness of *Evallogophilus*, I feel that better balance is achieved by submerging my genus beneath *Neogeophilus*.

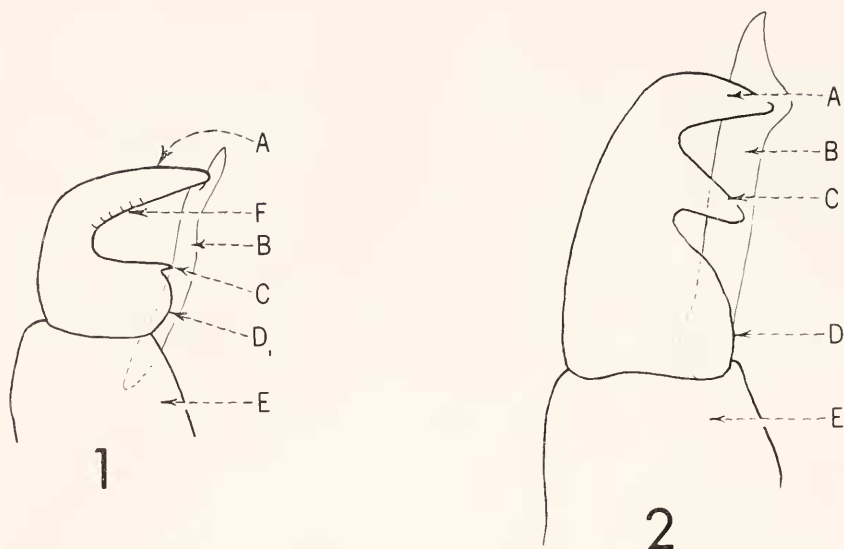


FIG. 1. *Neogcophilus ixion*, paratype. 11th right pretarsus, posterior aspect. A = claw proper. B = hypertrophied anterior parunguis. C = ventral tooth. D = fundus. E = tarsus. F = striations (absent on *N. primus*).

FIG. 2. *Neogcophilus primus* Silvestri. 11th right pretarsus, posterior aspect. A = claw proper. B = hypertrophied anterior parunguis. C = ventral tooth. D = fundus. E = tarsus.

Known species: *N. primus* Silvestri, 1917, p. 354, Mexico, Morelos: Cuernavaca. San Luis Potosi: 2.7 miles west of Santa Catarina at 3,500'. Tamaulipas: 83.2 miles north of Manuel at 500'; 2.8 miles south of Ciudad Victoria. Oaxaca: 21.8 miles north of Tlachatengo.

N. silvestri (Crabill), 1961, p. 177, Guatemala, Alta Verapaz: Semo-coch. Mexico, San Luis Potosi: 3.6 miles west of El Naranjo at 1200'. Tamaulipas: 20.6 miles east of Villa de Casas. Veracruz: Vulcan San Martin north of San Andres Tuxtla.

N. ixion, new species, q.v.

The new species presented below is clearly most like *silvestri* (Crabill) but differs strikingly from it in the nature of the fibulunguis. In *silvestri* the ventral or plantar tooth is very large and located upon the unguis, not upon the fundus; in *ixion* the ventral tooth is much smaller and is situated upon the fundus, not upon the unguis.

Neogcophilus ixion,⁷ new species

Holotype: female. Mexico, Veracruz: north of San Andres Tuxtla, on slope of Vulcan San Martin at 3,300'–3,500'. July 20–August 1, 1959. W. T. Keeton and B. D. Valentine, legg.

⁷ In mythology a Thessalonian king celebrated for sin and murder.

GENERAL. Length, about 33 mm. Pedal segments, 75. Body shape: dorsoventrally notably flattened; width essentially uniform. Color, pale yellowish white. ANTENNAE. Short, length to head length, 19:7; dorsoventrally slightly flattened, distally not notably attenuate; articles 2-5 slightly longer than wide, articles 6-13 slightly wider than long, submoniliform. Article 14 with an ectal and a mesal patch of short, flat special setae, these situated slightly distal to midlength. CEPHALIC PLATE. Wider than long, 8:7. Anteriorly pointed; sides strongly excurved; rear straight. Frontal suture absent. CLYPEUS. Much wider than long. Paraclypeal sutures oblique, straight, meeting labral fulcra at their extreme mesal ends. Anterior fenestra and posterior plagulae absent. Anteriorly with some 20 short setae, posteriorly glabrous. LABRUM. Consisting of one undivided hyaline piece, armed posteriorly with short, delicate, hyaline filaments. Fulcra short, transverse, not oblique. FIRST MAXILLAE. Coxosternum completely divided medially, lappets absent. Discrete medial lobes absent. Telopodites without lappets. SECOND MAXILLAE. Isthmus anteroposteriorly shallow, transversely wide; areolate, not suturate, not divided. Postmaxillary sclerites absent. Statumina absent. Telopodite: of three discrete parts; dorsal and ventral basal condyles absent; apical claw with a few minute terminal and mesal bristles.

PREHENSORS. Flexed, not surpassing anterior head margin. Denticles absent. Tarsungula: only slightly curved; dorsoventrally strongly flattened, bladelike; posterior edge deeply dissected forming about 16 coarsely regular serrations. Poison apparatus: calyx in upper trochanteroprefemur, subcordiform; gland terminating dorsal to prosternum. PROSTERNUM. Broad. Pleuroprosternal sutures strongly oblique, complete, terminating dorsolaterally. Pleurograms concursive with pleuroprosternal sutures, not extending to or toward condyles, hence in effect absent. Anterocentral condyles present.

PLEURITES. Spiracles weakly horizontally elliptical. Paratergites absent. LEGS. The first slightly shorter than the second. All including the more posterior notably robust and short. PRETARSI. Each fundamentally consisting of a basal fundus and an emergent unguis flanked by two parungues. Ungues: on most anterior legs only slightly curved, thereafter becoming very strongly bent, thereafter becoming slightly curved again; each fundus ventrally with a small tooth; each ventrally shortly and minutely serrate. Posterior parungues: minute and present on all ungues. Anterior parungues: on most anterior legs nearly as long as ungues, thin, spiniform; on legs of middle body longer than ungues, distally expanded, flat, hyaline; on rear legs as on most anterior legs, very long and spiniform. STERNITES. All slightly wider than long. Sulci,

sutures, depressions, *carpophagus*-structures, single pores and porefields absent. Setae sparse and short. Intersternites: on anterior body medially divided; on posterior body larger and undivided.

ULTIMATE PEDAL SEGMENT. Pretergite and tergite discrete; unfused, pretergital lateroposterior corners angularly extended; laterally not fissate. Tergite: longer than wide, sides weakly convergent, rear pointed obtusely. Presternite and sternite discrete, unfused. Sternite: wider than long, sides subparallel, posterolateral corners extended. Coxopleuron: moderately inflated; ventrally, laterally, and dorsally pierced with numerous freely-opening pores; setae short and sparse. Telopodite: thinner and much longer than penult; with two discrete (unfused) tarsalia, these equal; pretarsus absent.

POSTPEDAL SEGMENTS. Pregenital and genital sternites discrete, unfused. Genopods only basally adnate, otherwise separated, each uniaxial. Anal pores present, simple, not composite.

Paratype A. Same locality and date as holotype.

Paratype B. Veracruz: San Andres Mountains, 2.5 km west of Sontrecompan at 0-100'. September 18-21, 1965. G. E. Ball and D. R. Whitehead, legg.

Both paratypes are males: A, 77 leg pairs, 28 mm; B, 75 leg pairs, 30 mm. They are in substantial agreement with the holotype, except for the following secondary sexual features. The male coxopleura are postero-mesally slightly extended. The gonopods are widely separated, nowhere adnate, and prominently biarticular. The ultimate legs are longer and much more swollen than those of the female, and the male tarsalia are manifest as two entirely discrete, unfused articles.

KEY TO KNOWN NEOGEOPHILIDAE

- 1a. Ultimate pretergite entirely amalgamated with its tergite. Pregenital and genital sternites of female amalgamated without trace of demarcation. On at least six subultimate segments in both sexes the sternites entirely amalgamated with the subcoxae without trace of demarcation.....*Evallogophilus* Silvestri.....*E. mexicanus* Silvestri
- 1b. Ultimate pretergite discernible, i.e., not amalgamated with its tergite. Female pregenital and genital sternites separated and individually discernible. All sternites clearly separate from subcoxae, their intervening margins clearly discernible.....*Necogophilus* Silvestri.....2
- 2a. Prosternal denticles entirely absent. Ungular serrations essentially absent. Pretarsal ventral teeth large and well removed from the fundus.....*N. primus* Silvestri

- 2b. Prosternal denticles present. Ungular serrations clearly present, coarse.....3
- 3a. Pretarsal ventral teeth large and well removed from the fundus.....*N. silvestri* (Crabill)
- 3b. Pretarsal ventral teeth very small, located upon the fundus.....*N. irion* sp. n.

REFERENCES

- CRABILL, R. E. 1961. Concerning the Neogeophilidae, with proposal of a new genus. Ent. News, 72 (6 and 7), pp. 155-159, 177-190.
- SILVESTRI, F. 1917. Descrizione di due nuovi generi di Geophilidae (Chilopoda) del Messico. Boll. Laborat. Zool. Gener. Agrar. Portici, 12, 352-360.
- . 1919. Contributions to a knowledge of the Chilopoda Geophilomorpha of India. Rec. Indian Museum, 15, pp. 45-107.

(ENTOMOLOGIST'S RECORD, continued from p. 37)

Recent Gifts to the Cornell University Insect Collection: During the past 18 months, three rather substantial insect collections have been added to the Cornell University collection.

In October 1967, Dr. Mortimer D. Leonard of Washington, D. C., presented Cornell with his entire collection of Aphididae (Homoptera). This collection of nearly 17,000 slides, representing about 500 species was the result of a life time interest in the group. A number of papers by Dr. Leonard are based on this collection. Since the aphid collection at Cornell, previous to Dr. Leonard's gift, consisted largely of material assembled by the late Miss Grace H. Griswold, the Cornell collection of aphids has been designated, "The Griswold-Leonard Collection of Aphididae."

Dr. W. Wayne Boyle, recently of the Pennsylvania State University, gave his collection of exotic Erotylidae (Coleoptera) to Cornell in November 1967. The nearly 3,000 specimens comprising this collection are beautifully mounted and in superb condition. Only a portion of the specimens are determined and it is anticipated that the collection will serve as a fertile source of material for workers engaged in revisional studies of this family.

In September 1968, Mr. Roy Latham of Orient, New York, turned over to Cornell his entire collection of insects which he had built up over a period of approximately 60 years. No complete inventory has been made but the collection was housed in the equivalent of 325 Schmitt boxes. All the insects are from eastern Long Island and probably represent the largest single collection of specimens from this area. All orders found on Long Island are represented and most of the specimens have been determined by authorities in the various groups. A cursory examination of this collection indicates that it contains a number of species not previously known to occur in New York. —L. L. PECHUMAN, Department of Entomology, Cornell University, Ithaca, N. Y. 14850.

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